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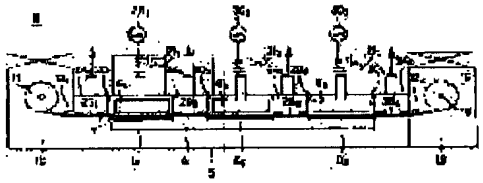
(54) PLASMA CVD DEVICE FOR FLEXIBLE FILM

(57)Abstract:
PROBLEM TO BE SOLVED: To form thin film having a uniform coating thickness distribution on the surface of a flexible film without damaging the same by running the flexible film between a planar type cathode electrode and a planar type heater by a plasma CVD method.
SOLUTION: The inside of a vacuum tank 5 in a plasma CVD(chemical vapor deposition) device 2 is vertically provided with a planar type heater 4. The space between a charging chamber 18 and a discharging chamber 19 is vertically provided with reaction chambers 201 to 203 in which the places facing to the planar type heater 4 are opened. The inside of each reaction chamber 201 to 203 is vertically provided with a planar cathode electrode 61 to 63 respectively. The planar type cathodes 61 to 63 are parallely arranged at a certain distance from the planar type heater 4. In the planar type cathode electrodes 61 to 63, many fine pores are made, and gaseous starting materials are introduced into the reaction chambers 201 to 203. A flexible film 7 is passed through the space between the planar cathode electrodes 61 to 63 and the planar type heater 4. In the planar type heater 4, heat is generated, while the flexible film 7 is heated, it is continuously run, and plasma CVD is executed in the reaction chambers 201 to 203.



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Partial English Translation of
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Paragraphs [0004]-[0006]:

[0004]

(omitted)

In Fig. 3, reference number 102 denotes a conventional plasma CVD apparatus.

[0005]

Plasma CVD apparatus 102 includes a vacuum vessel 105, a loading chamber 118; and a take-out chamber 119. A cylindrical can 103, reaction chambers 120_1-120_3, sending guide rollers 112_1, 112_2, and receiving guide rollers 114_1, 114_2 are provided in vacuum vessel 105. In this plasma CVD apparatus 102, a roll 111 of a flexible film is put in loading chamber 118. The leading edge of the film is pulled through each of rollers 112_1, 112_2, cylindrical can 103, and each of rollers 114_1, 114_2 to take-out chamber 119. Flexible film 107 in contact with cylindrical can 103 faces plate-type cathode electrodes 106_1-106_3 provided in reaction chambers 120_1-120_3.

[0006]

In the case of forming an amorphous solar battery, cylindrical can 103 is rotated to send flexible film 107 toward take-out chamber 119, while can 103 is used as an anode electrode and each plate-type cathode electrode 106_1-106_3 is provided with a high frequency voltage. In each of reaction chambers 120_1-120_3, plasma of a source gas is generated. Then, a p-layer (boron-doped a-Si:H), an i-layer (intrinsic a-Si:H), and n-layer (phosphorous-doped a-Si:H) are deposited in this order on flexible film 107 to form an amorphous solar battery of a p-i-n multilayer.

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